REASONPro™

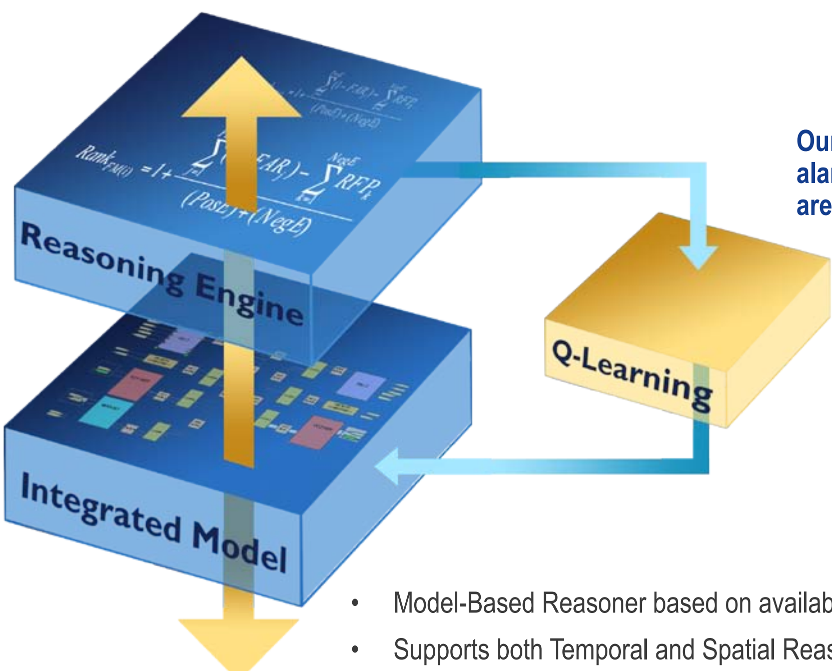
IMPACT

Model-Based Reasoning Software

Diagnostic/Prognostic Reasoning Software

The ReasonPro™ software suite is one of Impact Technologies' flagship products that implements proven, evidence-based reasoning together with an XML-based model to provide robust fault isolation. Our significant experience in developing and deploying the ReasonPro software suite includes helicopter engines and subsystems, ship propulsion systems, amphibious vehicle systems and avionic subsystems for the F-18 to name a few. ReasonPro is based on a model that is used to accurately characterize the relationships between symptoms, indicators or evidence with associated fault/failure modes. In addition, the integrated model has the ability to represent causality, hence both spatial (proximity) and temporal reasoning can be applied.

An illustration of Impact's integrated modeling capability using a model as the core knowledge-base for the evidence and temporal-based reasoning approach is shown below.



Our failure ranking protocol helps in reducing tiresome false alarm rates while conversely ensuring real fault probabilities are reacted to in a responsive manner.

- Model-Based Reasoner based on available evidence
- Supports both Temporal and Spatial Reasoning
- Automated learning processes built-in

The integrated failure mode model that represents the knowledge base for ReasonPro is an underlying XML database that is queried by the reasoning algorithms and implemented within an open-systems framework. The core database relates all potential evidence sources (anomaly detections, diagnostics, observations, experience, prognostics, etc.) with their associated particular faults or failure modes (and propagation effects) for the system under consideration. Because causality can be represented with the modeling paradigm, fault or failure mode propagation paths can then be analyzed based on associated PHM "monitor" activation sequences.

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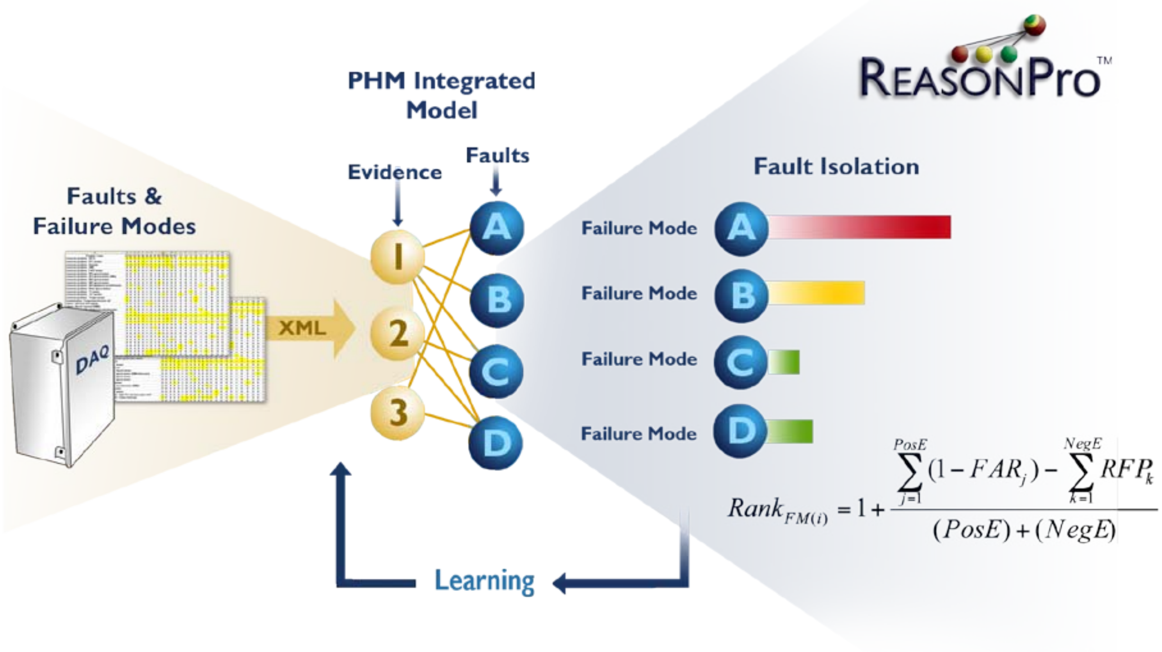
Impact's Model-Based Reasoning Software



The generic categories of evidence sources that can be represented in the PHM modeling paradigm are provided in the list below. However, the software can be easily reconfigured for specific application of customized evidence sources based on a given application.

- Maintainer and operator observations
- Continuous or Initiated Built In Tests (BIT)
- Anomaly Detectors or Event Logic
- Diagnostic Indicators
- Prognostic Indicators
- Legacy Experience

The ReasonPro™ software can be implemented within various real-time and off-line computing applications.

- ReasonPro - Embedded is code-optimized for running in real-time operating systems for on-board fault detection and reporting.
- ReasonPro - Remote has been configured to run on mobile devices for walk-around applications.
- ReasonPro - Evolution is used for off-line applications within depot-level test stands and related post analysis applications.